

Understanding Water Quality in the Rio Grande at the Buckman Direct Diversion Site and Otowi Bridge

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This presentation was prepared jointly by the City of Santa Fe and the New Mexico Environment Department (NMED) – Department of Energy (DOE) Oversight Bureau as part of a study to assess water quality in the Rio Grande at the Buckman Diversion Site and above Otowi Bridge. At the request of the Buckman Direct Diversion Board, Los Alamos National Laboratory (LANL) initiated bimonthly monitoring of the Rio Grande in July of 2008. The ongoing monitoring effort is to provide a characterization of contaminants, including LANL-derived contaminants, in the Rio Grande across all seasons and flow regimes. Along with the bimonthly data, this study also incorporates storm event samples collected by the NMED. Additional data sources include flow data from the United States Geological Survey. The study develops upon findings from an independent assessment by Kerry Howe of the ability of the City/County Water Treatment Plant (C/CWTP) to remove specific contaminants from Rio Grande water. Dr. Howe found the Rio Grande to be an acceptable source on an annual average basis, although he recommended minimizing the impact of storm events on water-treatment operations.

For the study, levels of gross alpha and beta were analyzed, along with alpha, beta and gamma emitters including americium, cesium, plutonium, radium, strontium and uranium. In addition, polychlorinated biphenyls (PCBs), suspended sediment concentration, and turbidity were graphed against flows of Rio Grande at the Otowi Gauge. Evidence from this analysis confirms that the contaminant levels in the Rio Grande are nearly always below levels established by the U.S. Environmental Protection Agency. In the case of PCBs, detects above regulatory standards were explained by detects of congeners in field blanks, an issue that was later rectified by altering the source of blank water.

In comparison with LANL's bimonthly data, samples collected by the NMED during storm events indicate elevated gross alpha and beta levels. Plutonium detected in stormwater from 2009 is indistinguishable from plutonium fallout from atmospheric testing of nuclear weapons. In the case of PCBs, data collected in an earlier study (2002–2003) show detections above the Human Health water quality criteria only during storm events, although detections during 2009 storm events were all below applicable criteria. To understand the implications for water quality over time, definitions of storm events and their frequency are considered, and the radionuclide constituents examined in more detail. Gross alpha and gross beta are shown to have a good correlation with suspended sediment concentration. These data suggest that while storm event flows account for a small percentage of annual flow conditions, additional storm event sampling is needed to determine the origins and identity of radionuclides in the Rio Grande during these particular events. These water quality dynamics may have important implications for the operation of water-treatment facilities.